



Rocky Flats Environmental Technology Site

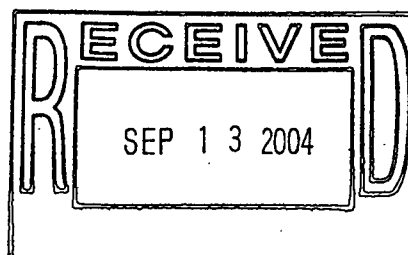
PRE-DEMOLITION SURVEY REPORT (PDSR)

BUILDING 705 CLOSURE PROJECT

August 17, 2004

REVISION 0

**CLASSIFICATION REVIEW NOT REQUIRED PER
EXEMPTION NUMBER CEX-005-02**



**ADMIN RECORD
B707-A-000111**

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TABLE OF CONTENTS

ABBREVIATIONS/ACRONYMS	IV
EXECUTIVE SUMMARY	V
1 INTRODUCTION	1
1.1 PURPOSE.....	1
1.2 SCOPE.....	1
1.3 DATA QUALITY OBJECTIVES.....	1
2 HISTORICAL SITE ASSESSMENT	2
3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS	2
4 CHEMICAL CHARACTERIZATION AND HAZARDS	3
4.1 ASBESTOS	3
4.2 BERYLLIUM (Be).....	4
4.3 RCRA/CERCLA CONSTITUENTS [INCLUDING METALS AND VOLATILE ORGANIC COMPOUNDS (VOCs)].....	4
4.4 POLYCHLORINATED BIPHENYLS (PCBs)	4
5 PHYSICAL HAZARDS	5
6 DATA QUALITY ASSESSMENT	5
7 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES	6
8 FACILITY CLASSIFICATION AND CONCLUSIONS.....	6
9 REFERENCES	7

ATTACHMENTS

- A Facility Location Map
- B Radiological Data Summaries and Survey Maps
- C Chemical Data Summaries and Sample Maps
- D Data Quality Assessment (DQA) Detail

ABBREVIATIONS/ACRONYMS

ACM	Asbestos Containing Material
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
DCGL _{EMC}	Derived Concentration Guideline Level – elevated measurement comparison
DCGL _w	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
HSAR	Historical Site Assessment Report
HEUN	Highly Enriched Uranyl Nitrate
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
K-H	Kaiser-Hill
LBP	Lead-based paint
LLW	Low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated Biphenyls
PDS	Pre-demolition survey
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSA	Removable Surface Activity
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Total surface activity
VOCs	Volatile organic compounds

EXECUTIVE SUMMARY

A Pre-Demolition Survey (PDS) was performed to enable compliant disposition and waste management of Building 705. Because this Type 2 building will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Building surfaces characterized as part of this PDS included the floors, walls and ceiling. Environmental media beneath and surrounding the facility was not within the scope of this PDS and will be addressed in accordance with the Soil Disturbance Permit process and in compliance with RFCA.

The PDS encompassed both radiological and chemical characterization to enable compliant disposition and waste management pursuant to the D&D Characterization Protocol (MAN-077-DDCP). The characterization built upon physical, chemical and radiological hazards identified in the facility-specific Historical Site Assessment Report and Reconnaissance Level Characterization Report for Building 705.

Results indicate that no radiological or chemical contamination exists in excess of the PDSP unrestricted release limits. Asbestos abatement has been performed in accordance with Colorado Department of Public Health and Environment (CDPHE) Regulation 8. Residual beryllium inside Building 705 was immobilized with a fixative and all final "as left" PDS beryllium results were below the investigative level of $0.1 \mu\text{g}/100\text{cm}^2$. Any potentially PCB-containing fluorescent light ballast and hazardous waste items (e.g., mercury thermostats, fluorescent light bulbs, mercury vapor light bulbs, mercury-containing gauges, circuit boards, leaded glass, and lead-acid batteries) were previously removed from the building and therefore, do not impact demolition activities.

Based upon this PDSR, Building 705 can be demolished and the waste managed as PCB Bulk Product waste or sanitary waste. To ensure the facility remains free of contamination and PDS data remain valid, Level 2 isolation controls have been established and the area posted accordingly.

1 INTRODUCTION

A Pre-Demolition Survey (PDS) was performed to enable compliant disposition and waste management of Building 705. Because this Type 2 building will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Building surfaces characterized as a part of this PDS included walls, ceilings and roof. Environmental media beneath and surrounding the facilities were not within the scope of this PDS and will be addressed in accordance with the Soil Disturbance Permit process and in compliance with RFCA.

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed, among these is Building 705. The location of this facility is shown in Attachment A, *Facility Location Map*. This facility no longer supports the RFETS mission and will be removed to reduce Site infrastructure, risks and/or operating costs.

Before this Type 2 facility can be demolished, the Data Quality Objectives (DQOs) for a Pre-Demolition Survey (PDS) must be satisfied; this document presents the PDS results for Building 705. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS built upon physical, chemical and radiological hazards identified in the facility-specific Historical Site Assessment Report and Reconnaissance Level Characterization Report for Building 705, dated April 23, 2003, Revision 0.

1.1 Purpose

The purpose of this report is to communicate and document the results of the Building 705 PDS effort. A PDS is performed prior to building demolition to define the final radiological and chemical conditions of a facility. Final conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

1.2 Scope

This report presents the final radiological and chemical conditions of Building 705. Environmental media beneath and surrounding the facilities are not within the scope of this PDSR and will be addressed in accordance with the Soil Disturbance Permit process and in compliance with RFCA.

1.3 Data Quality Objectives

The Data Quality Objectives (DQOs) used in designing this PDS were the same DQOs identified in the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to section 2.0 of MAN-127-PDSP for these DQOs.

2 HISTORICAL SITE ASSESSMENT

A Facility-specific Historical Site Assessment (HSA) and Reconnaissance Level Characterization (RLC) was conducted to understand the facility history and related hazards. The HSA consisted of facility walkdowns, interviews, and document review, including review of the Historical Release Report, and were used to design the RLC. The Building 705 RLC was performed in FY 2003 (refer to the *Reconnaissance Level Characterization Report for Building 705*, dated April 23, 2003 Rev. 0). Based on the RLC results, Building 705 was classified as a Type 2 facility due to beryllium contamination, and therefore, PDS characterization was required before demolition of the facility. This report documents the results of that PDS. The HSA and RLC results were used to identify PDS data gaps and needs, and to develop radiological and chemical PDS characterization packages. HSA and RLC documentation are located in the RISS Characterization Project files.

3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

Building 705 was characterized for radiological hazards per the PDSP. Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on the facility surfaces. Measurements were performed to evaluate the contaminants of concern. Based upon a review of historical and process knowledge, building walk-downs, and MARSSIM guidance, a Radiological Characterization Plan was developed during the planning phase that describes the minimum survey requirements (refer to the RISS Characterization Project files for the Building 705 Radiological Characterization Plan). One radiological survey unit package was developed for the interior of Building 705: 705001. Individual radiological survey unit packages are maintained in the RISS Characterization Project files.

The Building 705 survey unit package was developed in accordance with Radiological Safety Practices (RSP) 16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*. Total surface activity (TSA), removable surface activity (RSA), and scan measurements were collected in accordance with RSP 16.02 *Radiological Surveys of Surfaces and Structures*. Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, *Radiological Survey/Sample Data Analysis*. Quality control measures were implemented relative to the survey process in accordance with RSP 16.05, *Radiological Survey/Sample Quality Control*. Radiological survey data, statistical analysis results, survey locations, and radiological scan maps are presented in Attachment B, Radiological Data Summary and Survey Maps.

Building 705 Interior (Survey Unit 705001)

Building 705 interior was classified as a MARSSIM Class 2 Survey Unit because this building was not expected to contain residual radioactivity greater than the DCGL_w, but had a potential for low levels of contamination. A total of 21 TSA measurements (19 random grid and 2 QC) and 19 RSA measurements (19 random grid) were taken and scan surveys performed. Alpha scan surveys of 50% of the floor (216 m² minimum) and 25% of the wall and ceiling interior surfaces (474 m² minimum) at biased locations were performed. None of the measurements or scans indicated elevated activity above applicable transuranic DCGL values. Radiological survey data, statistical analysis results, survey locations, and radiological scan maps are presented in Attachment B, *Radiological Data Summary and Survey Maps*.

Building 705 Exterior:

The Building 705 exterior was radiologically surveyed during the RLC in accordance with PDSP requirements and met the PDSP radiological release limits. Confirmatory smear surveys on the exterior will be performed prior to demolition of Building 705.

4 CHEMICAL CHARACTERIZATION AND HAZARDS

Building 705 was characterized for chemical hazards per the PDSP. Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present on, or in the facility. Based upon a review of historical and process knowledge, visual inspections, and PDSP DQOs, additional sampling needs were determined. A Chemical Characterization Plan was developed during the planning phase that describes sampling requirements and the justification for the sample locations and estimated sample numbers. The contaminants of concern were asbestos and beryllium. Refer to Attachment C, Chemical Summary Data and Sample Maps, for details on sample results and sample locations. Isolation control postings are displayed on affected structures to ensure no hazardous materials are introduced.

4.1 Asbestos

A survey of building materials suspected of containing asbestos was conducted in Building 705 during the RLCR dated April 23, 2003. A CDPHE-certified asbestos inspector conducted the inspections, and suspect materials were identified for sampling at the discretion of the inspector. Prior to the PDS, friable and non-friable asbestos abatement and satisfactory clearance sampling was conducted per CDPHE, Regulation No. 8, Part B, *Emission Standards for Asbestos*. On this basis, no additional asbestos sampling was required or performed as part of the PDS.

4.2 Beryllium (Be)

A beryllium survey was conducted in Building 705 as part of the Building 705 RLCR, and beryllium contamination was identified throughout the building interior greater than the investigative and action levels. Extensive building stripout and decontamination was performed to remove the beryllium contamination. The first set of post-decontamination/PDS beryllium sample results indicated 14 of 80 samples above the PDSP beryllium action level of $0.2 \mu\text{g}/100\text{cm}^2$, ranging in levels up to $8.7 \mu\text{g}/100\text{cm}^2$ on the floor and $0.63 \mu\text{g}/100\text{cm}^2$ in the overhead surfaces. Therefore, additional decontamination was performed and a fixative was applied to all surfaces of the building interior to immobilize the loose beryllium. Follow up PDS beryllium smear samples were collected at the highest initial elevated locations to verify the fixative was effective. All follow up PDS beryllium smear sample results were less than the investigative limit of $0.1 \mu\text{g}/100\text{cm}^2$, thus confirming that the fixative was effective in all areas of elevated activity. However, the potential for Be exposure remains during demolition. Beryllium swipe samples for the PDS were collected in accordance with the PDSP and the *Beryllium Characterization Procedure*, PRO-536-BCPR, Revision 0, September 9, 1999. Final "as left" PDS beryllium laboratory sample data and location maps are contained in Attachment C, *Chemical Data Summaries and Sample Maps*.

4.3 RCRA/CERCLA Constituents [including metals and volatile organic compounds (VOCs)]

Building 705 functioned as a ceramics R&D laboratory and was later used as a coating laboratory. Although beryllium was the primary substance used, a variety of other metals (including chromium, cadmium, lead, nickel, and silver) and lab chemicals such as solvents and acids were also used. However, in 2001 equipment was removed under the hazards reduction process, and there is no evidence of contamination from past use.

A visual inspection of the empty building by RISS Environmental Compliance personnel verified the absence of hazardous waste stains and/or residuals on the walls, interior surface of the roof and concrete pad. Therefore, RCRA/CERCLA contamination is not suspected and samples were not taken as part of this PDS.

The building may have contained some RCRA regulated items, such as mercury thermostats, fluorescent light bulbs, mercury vapor light bulbs, mercury containing gauges, circuit boards, and lead-acid batteries. However, these items have been removed from the building and managed in accordance with the Colorado Hazardous Waste Act.

4.4 Polychlorinated Biphenyls (PCBs)

Based on the HSAR, interviews, facility walkdowns and a review of historical WSRIC processes, Building 705 does not have a history of PCB use or storage. The facility may have contained PCB fluorescent light ballasts, however, all leaking PCB ballasts, and those greater than 9 pounds, have been removed from the facility and managed appropriately.

Based on the age of Building 705, paints used on the facility may contain PCBs; and therefore, painted surfaces will be managed as PCB Bulk Product Waste. Painted concrete surfaces can be used as backfill on site in accordance with approval received from EPA in November 2001 (letter from K. Clough, US EPA Region 8, to J. Legare, DOE RFFO, 8EPR-F, Approval of the Risk-Based Approach for Polychlorinated Biphenyls (PCB)-Based Painted Concrete).

5 PHYSICAL HAZARDS

Physical hazards associated with Building 705 consists of those common to standard industrial environments, and include hazards associated with energized systems, utilities, and trips and falls. There are no other unique hazards associated with the facility. The facility has been relatively well maintained and is in good physical condition, and therefore, does not present hazards associated with building deterioration. Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

6 DATA QUALITY ASSESSMENT

Data used in making management decisions for decommissioning of Building 705, and consequent waste management, are of adequate quality to support the decisions documented in this report. The data presented in this report (Attachments B and C) were verified and validated relative to DOE quality requirements, applicable EPA guidance, and original project DQOs.

In summary, the Verification and Validation (V&V) process corroborates that the following elements of the characterization process are adequate:

- ◆ the *number* of samples and surveys;
- ◆ the *types* of samples and surveys;
- ◆ the sampling/survey process as implemented "in the field"; and
- ◆ the laboratory analytical process, relative to accuracy and precision considerations.

Details of the DQA are provided in Attachment D.

7 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

The demolition and disposal of Building 705 will generate a variety of wastes. Estimated waste types and waste volumes are presented below. All wastes can be disposed of as sanitary waste, except PCB Bulk Product Waste. PCB ballast and hazardous waste items have been removed and managed pursuant to Site PCB and waste management procedures.

WASTE TYPES AND VOLUME ESTIMATES							
Facility	Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM (cu ft)	Other Waste (cu ft)
705	5,500	0	400	0	1,100	0	None

8 FACILITY CLASSIFICATION AND CONCLUSIONS

Based on the analysis of radiological, chemical and physical hazards, Building 705 is ready for demolition. PDS results indicated that no radiological or chemical contamination exists in excess of the PDSP unrestricted release limits. PCB ballast and hazardous waste items have been removed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations.

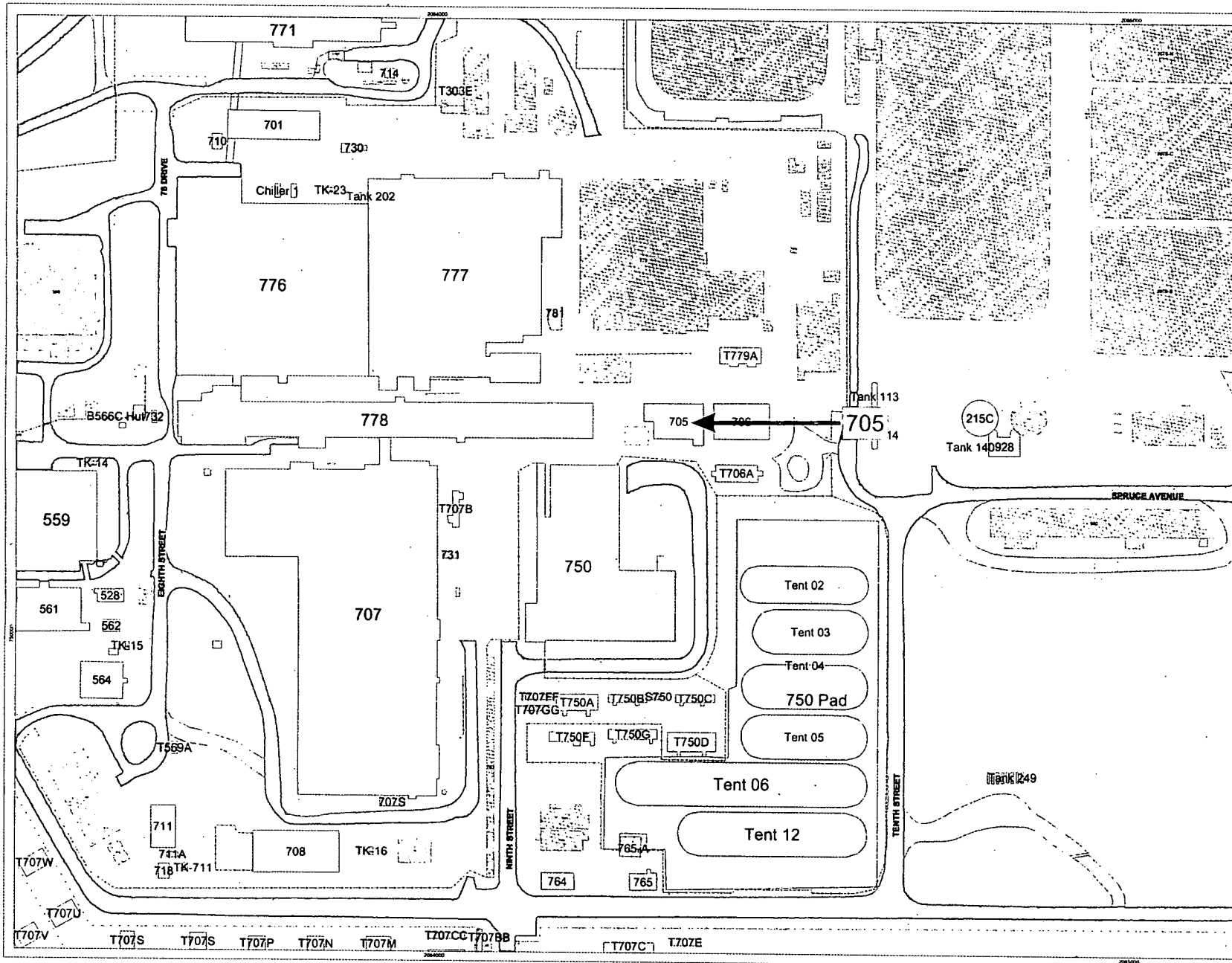
The PDS for Building 705 was performed in accordance with the DDCP and PDSP, all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria. Environmental media beneath and surrounding the facilities will be addressed at a future date in accordance with the Soil Disturbance Permit process and in compliance with RFCA. To ensure Building 705 remains free of contamination and PDS data remain valid, Level 2 Isolation Controls have been established and the facility posted accordingly.

9 REFERENCES

- DOE/RFFO, CDPHE, EPA, 1996. *Rocky Flats Cleanup Agreement (RFCA)*, July 19, 1996.
- DOE Order 5400.5, *Radiation Protection of the Public and the Environment*
- DOE Order 414.1A, *Quality Assurance*
- EPA, 1994. *The Data Quality Objective Process*, EPA QA/G-4.
- K-H, 1999. *Decommissioning Program Plan*, June 21, 1999.
- MAN-131-QAPM, *Kaiser-Hill Team Quality Assurance Program*, Rev. 1, November 1, 2001.
- MAN-076-FDPM, *Facility Disposition Program Manual*, Rev. 3, January 1, 2002.
- MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol*, Rev. 4, July 15, 2002.
- MAN-127-PDSP, *Pre-Demolition Survey Plan for D&D Facilities*, Rev. 1, July 15, 2002.
- MARSSIM - *Multi-Agency Radiation Survey and Site Investigation Manual* (NUREG-1575, EPA 402-R-97-016).
- PRO-475-RSP-16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure*, Rev. 1, May 22, 2001.
- PRO-476-RSP-16.02, *Pre-Demolition (Final Status) Radiological Surveys of Surfaces and Structures*, Rev. 1, May 22, 2001.
- PRO-477-RSP-16.03, *Radiological Samples of Building Media*, Rev. 1, May 22, 2001.
- PRO-478-RSP-16.04, *Radiological Survey/Sample Data Analysis for Final Status Survey*, Rev. 1, May 22, 2001.
- PRO-479-RSP-16.05, *Radiological Survey/Sample Quality Control for Final Status Survey*, Rev. 1, May 22, 2001.
- PRO-563-ACPR, *Asbestos Characterization Procedure*, Revision 0, August 24, 1999.
- PRO-536-BCPR, *Beryllium Characterization Procedure*, Revision 0, August 24, 1999.
- RFETS, *Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*.
- RFETS, *Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal*.
- RFETS, *RFCA RSOP for Recycling Concrete*, September 28, 1999
- Reconnaissance Level Characterization Report for Building 705*, dated April 23, 2003, Revision 0.

ATTACHMENT A

Facility Location Map



Rocky Flats Environmental Technology Site

Building 705

Map Features

- ☐ Buildings Remaining
- ☐ D&D Facility
- ☐ Paved Roads
- ☐ Dirt Roads
- ☐ Lakes
- ☐ Streams
- ☐ Railroad Removed
- ☐ Railroad Remaining
- ☐ Fence Removed
- ☐ Fence Remaining



1:727
1 inch equals 51 feet
State Plane Coordinate Projection
Colorado Central Zone (3476)
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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ATTACHMENT B

Radiological Data Summaries and Survey Maps

Survey Area: 2**Survey Unit:** 705001**Building:** 705**Description:** Building 705 Interior

Rocky Flats Environmental Technology Site Final Radiological Survey Summary Results

Total Surface Activity Measurements

Nbr Random Measurements Required: 15

Nbr Biased Measurements Required: 0

Nbr QC Required: 2

Nbr Random Measurements Performed: 19

Nbr Biased Measurements Performed: 0

Nbr QC Performed: 2

Alpha

Maximum: 39.4 dpm/100cm²Minimum: -7.6 dpm/100cm²Mean: 6.1 dpm/100cm²

Standard Deviation: 10.5

QC Maximum: 13.9 dpm/100cm²QC Minimum: 2.3 dpm/100cm²QC Mean: 8.1 dpm/100cm²Transuranic DCGL_w: 100.0 dpm/100cm²Transuranic DCGL_{EMC}: 300.0 dpm/100cm²

Removable Surface Activity Measurements

Nbr Random Measurements Required: 15

Nbr Biased Measurements Required: 0

Nbr Random Measurements Performed: 19

Nbr Biased Measurements Performed: 0

Alpha

Maximum: 7.7 dpm/100cm²Minimum: -0.9 dpm/100cm²Mean: 2.0 dpm/100cm²

Standard Deviation: 2.4

Transuranic DCGL_w: 20.0 dpm/100cm²

Media Sample Results

Nbr Random Required: 0

Nbr Biased Required: 0

Nbr Random Collected: 0

Nbr Biased Collected: 0

Conclusion - A comparison of the random, biased and QC measurement results against the PDSP Table 7-1 Surface Contamination Guideline limits was conducted; the comparison demonstrates that this survey unit passes the criterion specified in the PDSP.

Survey Area: 2

Survey Unit: 705001

Building: 705

Description: Building 705 Interior

Instrument Data Sheet

Inst/RCT Number	RCT ID	Analysis Date	Instr Model	Instru S/N	Probe Type	Calibration Due Dt	Instru Efficiency		A-Priori MDA (dpm/100cm ²)		Survey Type
							Alpha	Beta	Alpha	Beta	
1	711447	07/29/04	Electra	297	DP-6	01/27/05	0.219	NA	48.0	NA	T/S
2	711447	07/29/04	Electra	279	AP-6	10/01/04	0.183	NA	48.0	NA	S
3	711447	07/29/04	Electra	673	AP-6	01/06/05	0.176	NA	48.0	NA	S
4	511390	07/29/04	Electra	2352	DP-6	11/13/04	0.224	NA	48.0	NA	Q/S
5	712193	07/29/04	Ludlum 292	99042	NA	10/26/04	0.349	NA	10.0	NA	R

Survey Types: T = Total Surface Activity, Q = TSA QC, S = Scan, R = Removable Surface Activity, I = Investigation

17

Survey Area: 2

Survey Unit: 705001

Building: 705

Description: Building 705 Interior

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm ²)	Net Beta (dpm/100cm ²)	
705001PRP-N001	5	2.0	N/A	
705001PRP-N002	5	4.8	N/A	
705001PRP-N003	5	7.7	N/A	
705001PRP-N004	5	2.0	N/A	
705001PRP-N005	5	2.0	N/A	
705001PRP-N006	5	3.4	N/A	
705001PRP-N007	5	6.3	N/A	
705001PRP-N008	5	0.5	N/A	
705001PRP-N009	5	-0.9	N/A	
705001PRP-N010	5	-0.9	N/A	
705001PRP-N011	5	0.5	N/A	
705001PRP-N012	5	0.5	N/A	
705001PRP-N013	5	0.5	N/A	
705001PRP-N014	5	2.0	N/A	
705001PRP-N015	5	2.0	N/A	
705001PRP-N016	5	4.8	N/A	
705001PRP-N017	5	0.5	N/A	
705001PRP-N018	5	0.5	N/A	
705001PRP-N019	5	-0.9	N/A	

Comments:

Survey Area: 2

Survey Unit: 705001

Building: 705

Description: Building 705 Interior

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm ²)	Net Beta (dpm/100cm ²)	
705001PRP-N001	1	-0.3	N/A	
705001PRP-N002	1	39.4	N/A	
705001PRP-N003	1	-3.1	N/A	
705001PRP-N004	1	1.5	N/A	
705001PRP-N005	1	4.2	N/A	
705001PRP-N006	1	4.2	N/A	
705001PRP-N007	1	2.9	N/A	
705001PRP-N008	1	6.1	N/A	
705001PRP-N009	1	-7.6	N/A	
705001PRP-N010	1	8.8	N/A	
705001PRP-N011	1	6.1	N/A	
705001PRP-N012	1	4.2	N/A	
705001PRP-N013	1	19.8	N/A	
705001PRP-N014	1	12.0	N/A	
705001PRP-N015	1	1.5	N/A	
705001PRP-N016	1	4.2	N/A	
705001QRP-N016	4	2.3	N/A	
705001PRP-N017	1	-7.6	N/A	
705001PRP-N018	1	15.2	N/A	
705001QRP-N018	4	13.9	N/A	
705001PRP-N019	1	4.2	N/A	

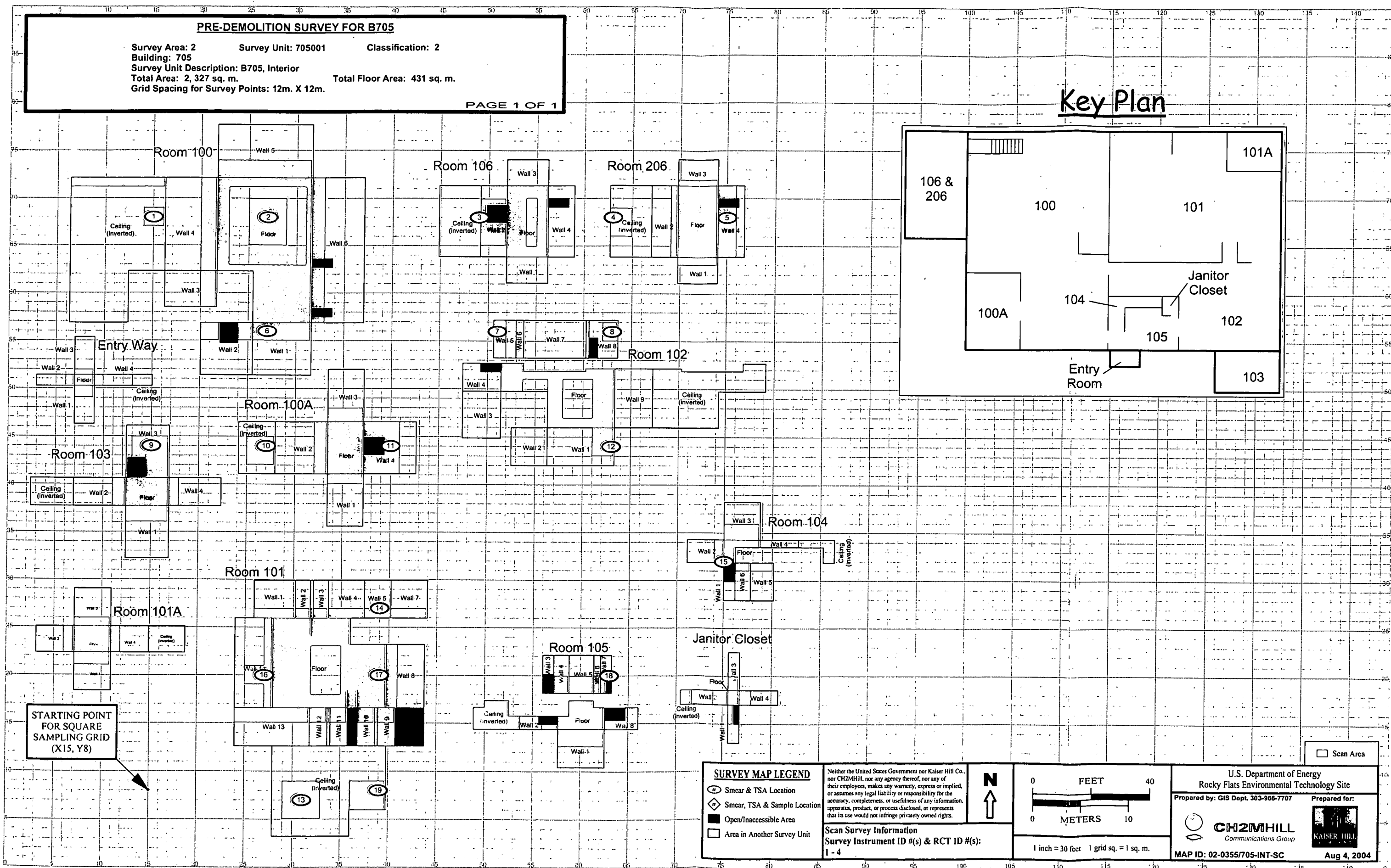
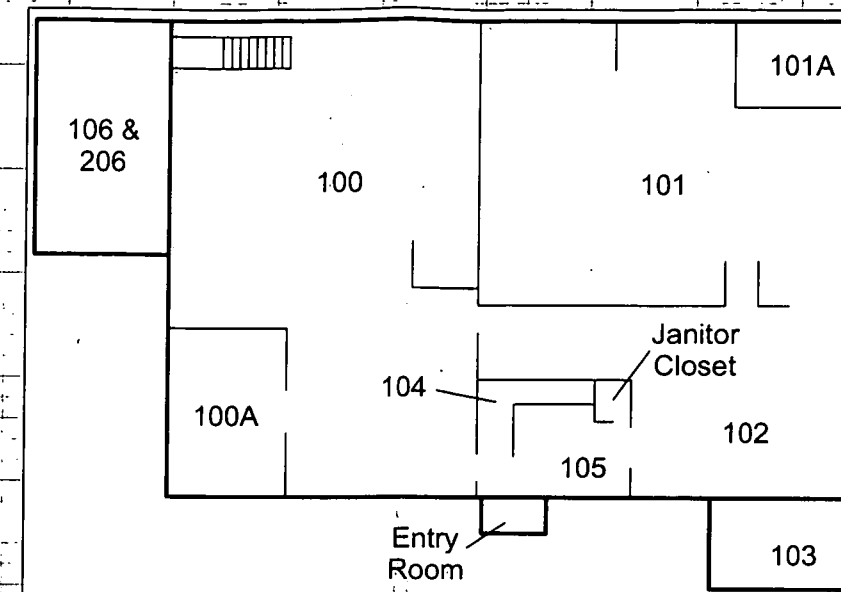
Comments:

PRE-DEMOLITION SURVEY FOR B705

Survey Area: 2 Survey Unit: 705001 Classification: 2
 Building: 705
 Survey Unit Description: B705, Interior
 Total Area: 2,327 sq. m. Total Floor Area: 431 sq. m.
 Grid Spacing for Survey Points: 12m. X 12m.

PAGE 1 OF 1

Key Plan



ATTACHMENT C

Chemical Data Summaries and Sample Maps

Beryllium Data Summary

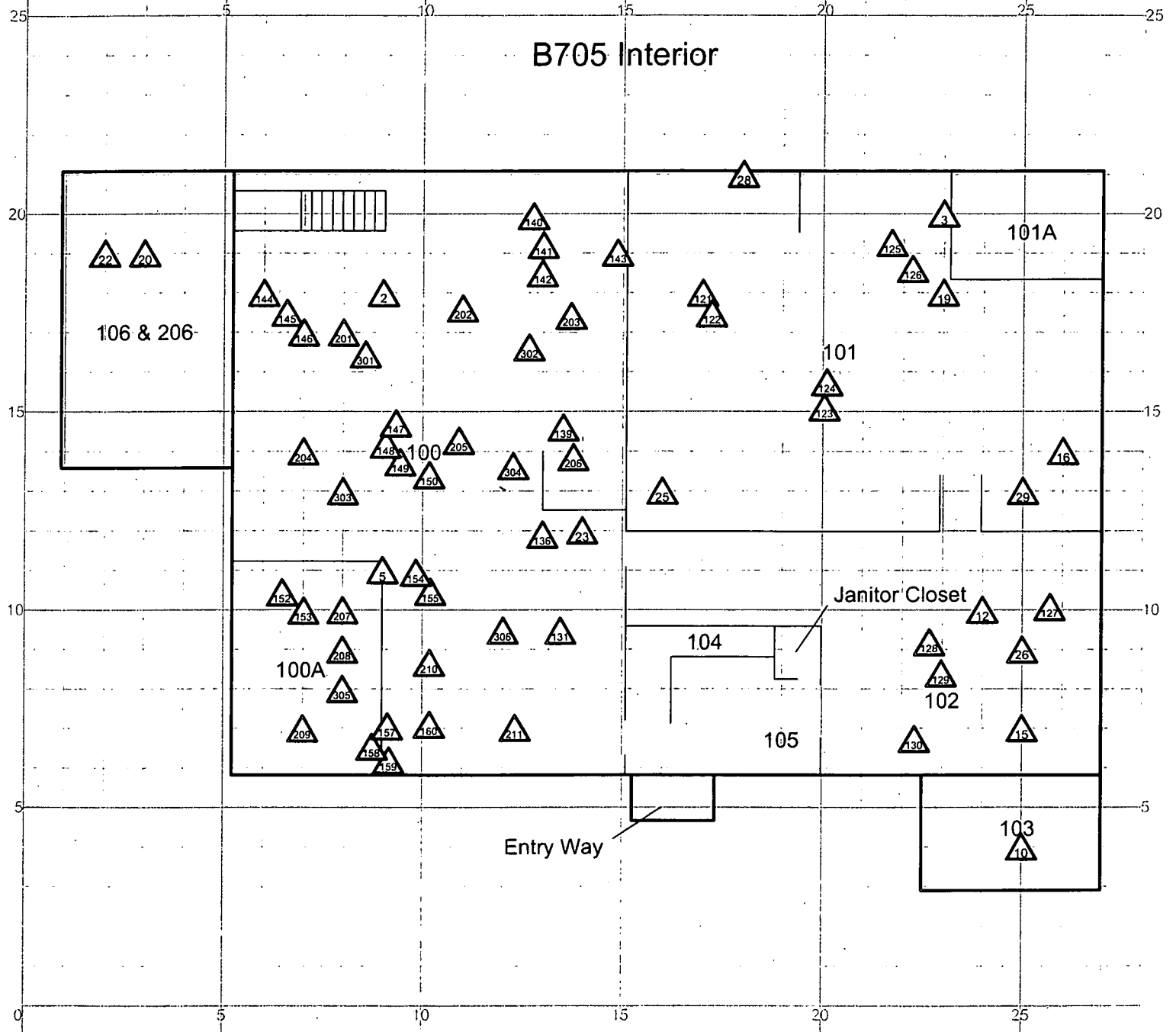
Sample Number	Map Survey Point Location	Room	Sample Location	Result (ug/100 cm ²)
Building 705 – RIN 04C0670				
705-07262004-00-002	2	100	Floor, random	< 0.1
705-07262004-00-003	3	101	Floor, random	< 0.1
705-07262004-00-010	10	103	Floor, random	< 0.1
705-07262004-00-015	15	102	Floor, random	< 0.1
705-07262004-00-016	16	101	Floor, random	< 0.1
705-07262004-00-019	19	101	Floor, random	< 0.1
705-07262004-00-020	20	106	Floor, random	< 0.1
705-07262004-00-022	22	206	Floor, random	< 0.1
705-07262004-00-023	23	100	Floor, random	< 0.1
705-07262004-00-025	25	101	Floor, random	< 0.1
705-07262004-00-026	26	101	Floor, random	< 0.1
705-07262004-00-028	28	101	Floor, random	< 0.1
705-07262004-00-029	29	101	Floor, random	< 0.1
705-07262004-00-121	121	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-122	122	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-123	123	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-124	124	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-125	125	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-126	126	101	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-127	127	102	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-128	128	102	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-129	129	102	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-130	130	102	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-131	131	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-136	136	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-139	139	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-140	140	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-141	141	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-142	142	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-143	143	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-144	144	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-145	145	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-146	146	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-147	147	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-148	148	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-149	149	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-150	150	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-152	152	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-153	153	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-154	154	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-155	155	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-157	157	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-158	158	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-159	159	100	Ceiling components (i.e. piping & joists), biased	< 0.1
705-07262004-00-160	160	100	Ceiling components (i.e. piping & joists), biased	< 0.1
RIN 04Z2372 – Post Wipe down-Pre Fixative				
705-08052004-314-001	201	100	Floor, biased	< 0.1
705-08052004-314-002	202	100	Floor, biased	< 0.1
705-08052004-314-003	203	100	Floor, biased	< 0.1
705-08052004-314-004	204	100	Floor, biased	< 0.1
705-08052004-314-005	205	100	Floor, biased	< 0.1
705-08052004-314-006	206	100	Floor, biased	< 0.1
705-08052004-314-009	209	100	Floor, biased	< 0.1
705-08052004-314-010	210	100	Floor, biased	< 0.1
705-08052004-314-011	211	100	Floor, biased	< 0.1
RIN 04C0705 – Post Fixative				
705-08112004-00-01	301	100	Floor, biased	< 0.1
705-08112004-00-02	302	100	Floor, biased	< 0.1
705-08112004-00-03	303	100	Floor, biased	< 0.1
705-08112004-00-04	304	100	Floor, biased	< 0.1
705-08112004-00-05	305	100A	Floor, biased	< 0.1
705-08112004-00-06	306	100	Floor, biased	< 0.1

22

CHEMICAL SAMPLE MAP

Building 705
Beryllium
Floor Area = 431 sq. m. = 4,639 sq.ft
No. of Random Samples = 29

PAGE 1 OF 1

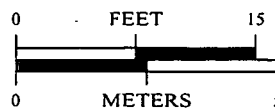


SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location

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- Open/Inaccessible Area
- Area in Another Survey Unit



1 inch = 12 feet 1 grid sq. = 1 sq. m.

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707

Prepared for:



CH2MHILL
Communications Group



MAP ID: 02-0355/B705-BE

Oct 7, 2003

ATTACHMENT D

Data Quality Assessment (DQA) Detail

DATA QUALITY ASSESSMENT (DQA)

VERIFICATION & VALIDATION (V&V) OF RESULTS

V&V of the data confirm that appropriate quality controls are implemented throughout the sampling and analysis process, and that any substandard controls result in qualification or rejection of the data in question. The required quality controls and their implementation are summarized in a tabular, checklist format for each category of data – radiological surveys and chemical analyses (specifically beryllium).

DQA criteria and results are provided in a tabular format for each suite of surveys or chemical analyses performed. The radiological survey assessment is provided in Table D-1 and beryllium in Table D-2. A data completeness summary for all results is given in Table D-3.

All relevant Quality records supporting this report are maintained in the RISS Characterization Project File. The report will be submitted to the CERCLA Administrative Record for permanent storage within 30 days of approval by the Regulators. All radiological data are organized into Survey Packages, which correlate to unique (MARSSIM) Survey Units. Chemical data are organized by RIN (Report Identification Number) and are traceable to the sample number and corresponding sample location.

Beta/gamma survey designs were not implemented for Building 705 based on the conservatism of the transuranic limits used as DCGLs in the unrestricted release decision process. Survey designs were implemented based on the transuranic limits used as DCGLs in the unrestricted release decision process. All survey results were evaluated against, and were less than the Transuranic DCGL_w (100 dpm/100cm²) and the Uranium DCGL_w (5,000 dpm/100cm²) unrestricted release limits.

Consistent with EPA's G-4 DQO process, the radiological survey design for each survey unit performed per PDS requirements was optimized by checking actual measurement results acquired during pre-demolition surveys against the model output with original estimates. Use of actual sample/survey (result) variances in the MARSSIM DQO model confirms that an adequate number of surveys were acquired.

DQA SUMMARY

In summary, the data presented in this report have been verified and validated relative to the quality requirements and project decisions as stated in the original DQOs. All data are useable based on qualifications stated herein and are considered satisfactory without qualification. All media surveyed and sampled yielded results less than their associated action levels and with acceptable certainties except the following anomalous situation:

- A total of 86 random and biased beryllium samples were taken as part of this PDS. However, only beryllium sample results less than the investigative level ($0.1 \mu\text{g}/100\text{cm}^2$) are reported in the Beryllium Data Summary (refer to Attachment C), resulting in a total of 61 reported beryllium results. The first set of post-decontamination/PDS beryllium sample results indicated 14 of 80 samples (RIN04C0670 and RIN04Z2372) above the PDSP beryllium action level of $0.2 \mu\text{g}/100\text{cm}^2$, ranging in levels up to $8.7 \mu\text{g}/100\text{cm}^2$ on the floor and $0.63 \mu\text{g}/100\text{cm}^2$ in the overhead surfaces. Therefore, additional decontamination was performed and a fixative was applied to all surfaces of the building interior to immobilize the loose beryllium. Follow-up PDS beryllium smear samples (RIN04C0705) were collected at the highest initial elevated locations to verify the fixative was effective. All follow-up PDS beryllium smear sample results were less than the investigative limit of $0.1 \mu\text{g}/100\text{cm}^2$, thus confirming that the fixative was effective in all areas of elevated activity. As a result, all final "as left" beryllium results meet unrestricted release levels.

Based upon an independent review of the radiological data, it is determined that the original project DQOs satisfied MARSSIM guidance. All facility contamination levels were below applicable DCGL unrestricted release levels. Minimum survey requirements were met, sampling/survey protocol was performed in accordance with applicable RSPs, survey units were properly designed and bounded, and instrument performance and calibration were within acceptable limits. All results meet the PDS unrestricted release criteria.

Chain of Custody was intact; documentation was complete, hold times were acceptable (where applicable,) and packaging integrity/custody seals were maintained throughout the sampling/analysis process. Level 2 Isolation Controls have been posted to prevent the inadvertent introduction of contamination into the facility. On this basis, Building 705 meets the unrestricted release criteria with the confidences stated herein.

Table D-1 V&V of Radiological Results for Building 705

V&V CRITERIA, RADIOLOGICAL SURVEYS		K-H RSP 16.00 Series MARSSIM (NUREG-1575)		
QUALITY REQUIREMENTS				
	Parameters	Measure	Frequency	COMMENTS
ACCURACY	Initial calibrations	90%<x<110%	≥1	Multi-point calibration through the measurement range encountered in the field; programmatic records.
	Daily source checks	80%<x<120%	≥1/day	Performed daily/within range.
	Local area background: Field	Typically < 10 dpm	≥1/day	All local area backgrounds were within expected ranges (i.e., no elevated anomalies.)
PRECISION	Field duplicate measurements for TSA	≥5% of real survey points	≥10% of reals	N/A
REPRESENTATIVENESS	MARSSIM methodology: Survey Unit 705001 (interior).	statistical and biased	NA	Random w/ statistical confidence.
	Survey Maps	NA	NA	Random and biased measurement locations controlled/mapped to ±1m.
	Controlling Documents (Characterization Pkg; RSPs)	qualitative	NA	Refer to the Characterization Package (planning document) for field/sampling procedures (located in Project files); thorough documentation of the planning, sampling/analysis process, and data reduction into formats.
COMPARABILITY	Units of measure	dpm/100cm ²	NA	Use of standardized engineering units in the reporting of measurement results.
COMPLETENESS	Plan vs. Actual surveys Usable results vs. unusable	>95% >95%	NA	See Table D-3 for details.
SENSITIVITY	Detection limits	TSA: ≤50 dpm/100cm ² RA: ≤10 dpm/100cm ²	all measures	PDS MDAs ≤ 50% DCGL _w

Table D-2 V&V of Beryllium Results for Building 705

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		
BERYLLIUM	Prep: NMAM 7300 METHOD: OSHA ID-125G	LAB ---->	Johns Manville, Littleton, Co.	
		RIN ---->	RIN04C0670 RIN04Z2373 RIN04C0705	
QUALITY REQUIREMENTS				COMMENTS
ACCURACY	Calibrations Initial	linear calibration	≥1	All results were below associated action levels.
	Continuing	80%<%R<120%	≥1	
	LCS/MS	80%<%R<120%	≥1	
	Blanks – lab & field	<MDL	≥1	
	Interference check std (ICP)	NA	NA	
PRECISION	LCSD	80%<%R<120% (RPD<20%)	≥1	
	Field duplicate	all results < RL	≥1	
REPRESENTATIVENESS	COC	Qualitative	NA	
	Hold times/preservation	Qualitative	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)	Qualitative	NA	
COMPARABILITY	Measurement units	ug/100cm ²	NA	
COMPLETENESS	Plan vs. Actual samples Usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	Detection limits	MDL of 0.00084 ug/swipe	all measures	

Table D-3 Data Completeness Summary For Building 705

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC) ^A	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Beryllium	Building 705 (interior and exterior)	49 samples (29 random/20 biased)	86 samples (29 random/57 biased)	No contamination found at any location after decontamination and immobilization	<p>10CFR850; OSHA ID-125G</p> <p>RIN04C0670: map locations 2. 3.10, 15, 16, 19, 20,22, 23, 25, 26, 28, 29, 121-131, 136, 139-150, 152-155 and 157-160.</p> <p>RIN04Z2372: map locations 201-206 and 209-211.</p> <p>RIN04C0705: map locations 301-306</p> <p>The actual number of samples taken differs from the number of sample map and Attachment C table locations because sample results greater than the investigative level (0.1 ug/100cm²) were not reported, as they have been decontaminated and/or immobilized in place by application of a fixative. Thus, the actual number taken is different than the number reported, and the sample numbering sequence is not continuous. Refer to section 4.2 and Attachment D (DQA) for a detailed discussion.</p> <p>No results above the action level (0.2 ug/100cm²) or investigative level (0.1 ug/100cm²) remain.</p>
Radiological	Survey Area 2 Survey Unit: 705001 Bldg. 705 (interior)	<p>15 α TSA (15 systematic)</p> <p>15 α Smears (15 systematic)</p> <p>2 QC TSA</p> <p>50% scan of floors and 25% scan of the walls and ceiling surfaces</p>	<p>19 α TSA (19 systematic)</p> <p>19 α Smears (19 systematic)</p> <p>2 QC TSA</p> <p>50% scan of floors and 25% scan of the walls and ceiling surfaces</p>	No contamination at any location; all values below unrestricted release levels	Transuranic DCGLs used.